



2nd LIFE EXTRUCLEAN NEWSLETTER

What is LIFE EXTRUCLEAN project about?

LIFE EXTRUCLEAN project aims to demonstrate the viability of the implementation of the supercritical fluids extraction (SFE) technology, in the extrusion process involved in plastics recycling, leading to a recycled material free of hazardous contaminants and a recycling process with improved efficiency, in comparison with the current technology, for hazardous plastic waste (reduced number of washing & drying stages involved, less energy and resources consumption, less effluents to manage).

LIFE EXTRUCLEAN focuses on plastic packages that have contained dangerous substances, and therefore they become hazardous waste after use. The generally accepted method to eliminate the danger of a hazardous container is it's emptied, the triple rinsing and draining. This method is online applied in the recycling of dangerous plastic packaging. In the line the packages gets a prerinse, are grinded in smaller pieces and cleaned by a series of washes (with different washing agents, detergents or surfactants) and subsequent rinsing and drying. After drying the material, it can be processed through an extrusion line, getting a recycled material in pellet form. Nevertheless this recycled material show lower mechanical properties when compared to virgin grades. So, this process is characterized by a high water consumption, high consumption of cleaning agents, high energy consumption and high production of wastewater.

LIFE EXTRUCLEAN process will allow a considerable reduction of these waste flows, so lowering the environmental impact of the process and reaching at least the same efficacy in the hazardous character of the recycled material.

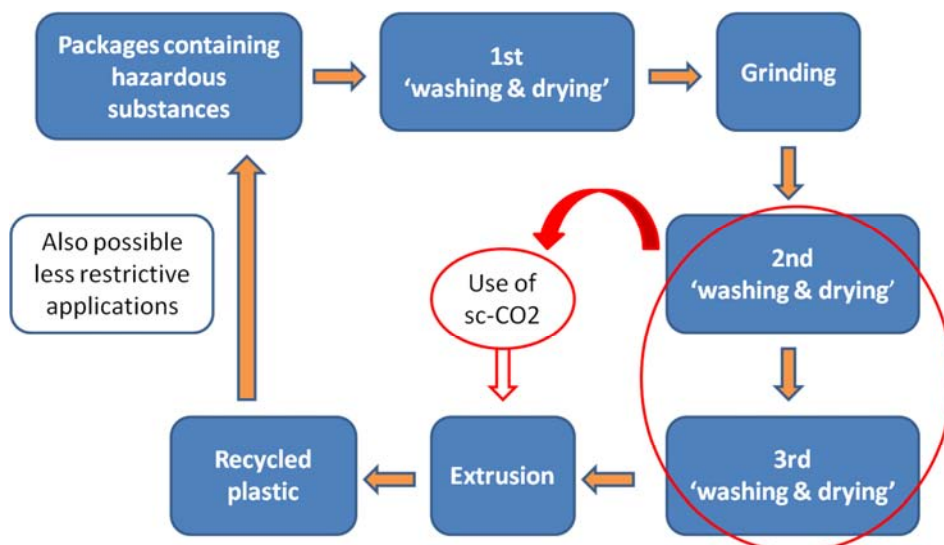


Fig 1. Life cycle of the recycling process according to EXTRUCLEAN project



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LIFE EXTRUCLEAN

The project consortium is formed by the following specialized companies and centers:

- AIMPLAS: Asociación de Investigación de Materiales Plásticos y Conexas in Valencia, Spain.
- ACTECO: Acteco Productos y Servicios S.L in Alicante, Spain.
- AIDIMA: Asociación de Investigación y Desarrollo en la Industria del Mueble y Afines in Valencia, Spain.
- ARVET: Agrupación de Exportadores de Transformados in Valencia, Spain.
- ENPLAST: Enplast S.A in Madrid, Spain

An overview of the LIFE EXTRUCLEAN partners and their role in the project is shown in figure 2 below:

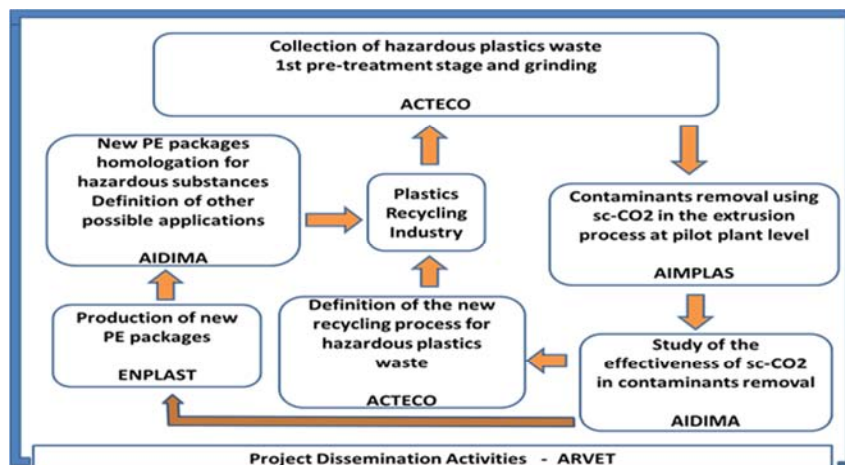


Fig 2. Overview of the partners and their role in the project



LIFE EXTRUCLEAN consortium Partners during the 9 Month meeting in AIDIMA, Spain (30th March 2015)



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About the LIFE+ programme

The LIFE programme is the EU's funding instrument for the environment and climate action. The general objective of LIFE is to contribute to the implementation, updating and development of EU environmental and climate policy and legislation by co-financing projects with European added value.

LIFE began in 1992 and to date there have been four complete phases of the programme (LIFE I: 1992-1995, LIFE II: 1996-1999, LIFE III: 2000-2006 and LIFE+: 2007-2013). During this period, LIFE has co-financed some 4 171 projects, contributing approximately €3.4 billion Euros to the protection of the environment and climate.

The European Commission (DG Environment and DG Climate Action) manages the LIFE programme. The Commission has delegated the implementation of many components of the LIFE programme to the Executive Agency for Small and Medium-sized Enterprises (EASME). External selection, monitoring and communication teams provide assistance to the Commission and EASME. The European Investment Bank will manage the two new financial instruments (NCFE and PF4EE).

The LIFE EXTRUCLEAN project has been funded by the European Union LIFE+: 2007-2013 in the area of Environment Policy and Governance.

LIFE EXTRUCLEAN on Internet

Updated information about LIFE EXTRUCLEAN is available through the link <http://www.life-extruclean.eu/>, our Twitter @lifeExtruclean and our Facebook fan page of LIFE EXTRUCLEAN.



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LIFE EXTRUCLEAN dissemination in the media

LIFE EXTRUCLEAN project has been disseminated by our consortium throughout different media channels. A press release about the project was launched, with a great impact in the different media.

Moreover, the LIFE EXTRUCLEAN consortium has presented the project in different events, such as the National Environment Congress CONAMA (24-25/11/2014), technical seminar organized by ECOEMBES and ANARPLA (18/07/2014), technical seminar organized by AIMPLAS in Barcelona (1/10/2014), seminar "Aportando Valor al CO₂" organized by IMDEA Energy, PTECO₂ and SusChem-Spain (17-18/02/ 2015), Hispack (21/04/2015), among others

LIFE EXTRUCLEAN 9 Month objectives and results

The work carried out within the first 9 months of the project was mainly focused on the following areas of the project.

Update the review of the state of the art

We have updated the information available regarding: type of contaminants found in PE waste, previous works related to the use of hazardous contaminants simulants, current recycling technologies for hazardous plastic waste, the impact of these technologies in terms of environmental aspects, the current situation of the recycled plastics market and the use of sc-CO₂ in extrusion processes.

Definition of case studies

Two different case studies have been defined: PE packages for industrial products and PE packages for phytosanitary products. Proper standard and model liquids have been chosen to simulate the effect of hazardous substances on plastic material and to contaminate in a controlled way PE packages to assess the effectiveness of the decontamination technology proposed.



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Fig 1. Examples of PE jerricans for industrial liquids and phytosanitarios.

Implementation of sc-CO₂ technology in single screw extrusion for eliminating toxicity in PE waste

After setting-up the extrusion tandem and proper peripheral equipment, the machine parameters (output, temperature profile and melt pressure) were optimized allowing stable conditions for injection of sc-CO₂ gas flow.

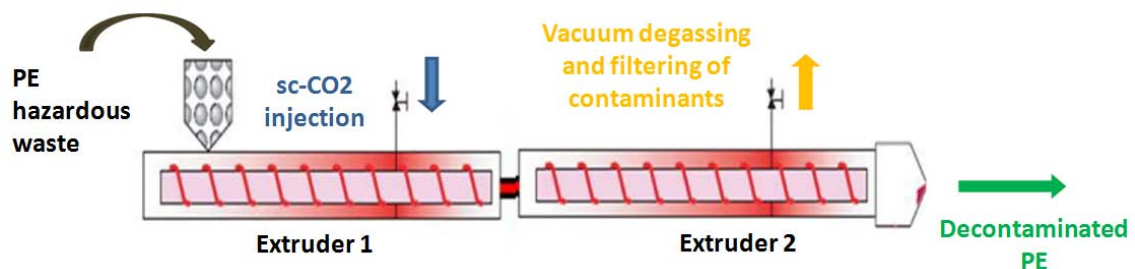


Fig 2. Extrusion tandem configuration for PE decontamination with sc-CO₂

In a first set of trials, HDPE pellets contaminated with model liquids in a controlled way were decontaminated using the extrusion line with assisted sc-CO₂ employing different gas flow percentages.

The PE contamination process selected has proved to be effective according to the aim of the project, checked by both gravimetric increment and gas chromatographic measurements.



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Figure 3. Samples contamination

Gas chromatography analysis performed on samples decontaminated in the first set of trials show an effective reduction in the substances present in the PE pellets contaminated with standard liquids.

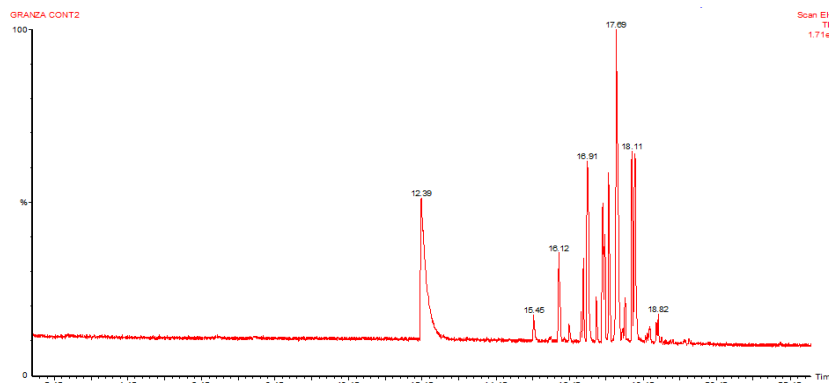


Figure 4. Gas chromatography of contaminated sample

Monitoring of the impact of the project actions

The monitoring of the impact of the project is periodically conducted in environmental, economic, social and logistic terms. These actions will be performed throughout the project to minimize negative impacts and increase positive impacts.





Future work:

The work in next months of LIFE EXTRUCLEAN project will be focused in the optimization of the decontaminated process and verification of analytical results.

AS well we will work with real samples from jerry cans contaminated with hazardous substances (in addition to the controlled samples that have been used before), and we will continue with the monitoring work.



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